INSTALLATION - USER - MAINTENANCE MANUAL

Air/water heat pumps with axial-flow fans and pump assembly

HFC R-410A

inverter TECHNOLOGY

i-SACS-S 0011 - 0061
HM 0011 - 0061

INDEX

U	I	A	General warnings	3
U	I	A	Waiver of liability	3
U	I	A	Fundamental safety rules	3
	I	A	Receiving and handling the product	4
	I	A	Description of standard unit	5
	I		Dimensioned drawings	7
	I		Installation	8
	I	A	Water connections	8
	I	A	Electrical connections	10
	I	A	General technical data	17
	I	A	Operating limits	18
		A	Checking and starting up the unit	19
		A	Shutting down for long periods	20
		A	Routine maintenance	20
		A	Special maintenance	20
		A	Displaying alarms	21
		A	Troubleshooting	22
		A	Controller navigation menu	24
		A	Disposal	25
U	I	A	Useful information	25

The following symbols are used in some parts of this publication and inside the unit:

U **User**

I **Installer**

A **Assistance**

Important

Prohibition

Danger voltage

Danger moving blades

Danger high temperatures

Eurovent certification program.

The manufacturer reserves the right to modify the data in this manual without warning.

ENVIRONMENTAL INFORMATION: This unit contains fluorinated greenhouse gases covered by the Kyoto Protocol. The maintenance and disposal operations must only be carried out by qualified personnel. R410A, GWP=1975

GENERAL WARNINGS

These appliances have been designed to chill and/or heat water and must be used in applications compatible with their performance characteristics; these appliances are designed for residential or similar applications.
Incorrect installation, regulation and maintenance or improper use absolve the manufacturer from all liability, whether contractual or otherwise, for damage to people, animals or things.
Only those applications specifically indicated in this list are permitted.

Read this manual carefully. All work must be carried out by qualified personnel in conformity with legislation in force in the country concerned.

The warranty is void if the above instructions are not respected and if the unit is started up for the first time without the presence of personnel authorised by the Company (where specified in the supply contract) who should draw up a “start-up” report.

The documents supplied with the unit must be consigned to the owner who should keep them carefully for future consultation in the event of maintenance or service.
When the items are consigned by the carrier, check that the packaging and the unit are undamaged.
If damage or missing components are noted, indicate this on the delivery note. A formal complaint should be sent via fax or registered post to the After Sales Department within eight days from the date of receipt of the items.
All repair or maintenance work must be carried out by the Company’s Technical Service or qualified personnel following the instructions in this manual.
Do not modify or tamper with the appliance as this may create situations of danger; in such cases the manufacturer of the appliance is not liable for any damage caused.
The unit only works correctly if combined with the corresponding outdoor unit.
Correct operation and safety of the unit are not ensured when using outdoor units of other brands/ manufacturers.

WAIVER OF LIABILITY

This publication is the sole property of Climaveneta. Any reproduction or disclosure of such is strictly prohibited without the written authorisation of Climaveneta.

This document has been prepared with maximum care and attention paid to the content shown. Nonetheless, Climaveneta waives all liability deriving from the use of such document.

Read this document carefully.
All work must be performed, components selected and materials used in complete accordance with the legislation in force in material in the country concerned, and considering the operating conditions and intended uses of the system, by qualified personnel.

The data contained in this publication may be changed without prior notice.

FUNDAMENTAL SAFETY RULES

When operating equipment involving the use of electricity and water, a number of fundamental safety rules must be observed, namely:

The unit must not be used by children or by unfit persons without suitable supervision.
Do not touch the unit with bare feet or with wet or damp parts of the body.
Never perform any cleaning operations before having disconnected the unit from the mains power supply.
Do not modify safety or control devices without authorisation and instructions from the manufacturer.
Do not pull, detach or twist the electrical cables coming from the unit, even when disconnected from the mains electricity supply.

Do not open doors or panels providing access to the internal parts of the unit without first ensuring that the mains switch is in the off position.
Do not introduce pointed objects through the air intake and outlet grills.
Do not dispose of, abandon or leave within reach of children packaging materials (cardboard, staples, plastic bags, etc.) as they may represent a hazard.

The i-SACS-S and HM appliances are supplied without the main switch.
Power supply to the unit must be disconnected using a switch with suitable characteristics, to be supplied and installed by the installer.
Check the power supply voltage used on the labels applied to the unit.

Respect safety distances between the unit and other equipment or structures. Guarantee adequate space for access to the unit for maintenance and/or service operations.

Power supply: the cross section of the electrical cables must be adequate for the power of the unit and the power supply voltage must correspond with the value indicated on the respective units. All units must be earthed in conformity with legislation in force in the country concerned.

Terminals 3-4 and 5-6 on the HM hydronic module may be powered even after the unit is disconnected.
Make sure power is not connected before proceeding.

Water connections should be carried out as indicated in the instructions to guarantee correct operation of the unit.
Add glycol to the water circuit if the unit is not used during the winter or the circuit is not emptied (only modules installed outdoors).

Handle the unit with the utmost care (see weight distribution table) to avoid damage.

RECEIVING AND HANDLING THE PRODUCT

I A

The units are supplied complete with:
- installation, user and maintenance manual;
- CE declaration;

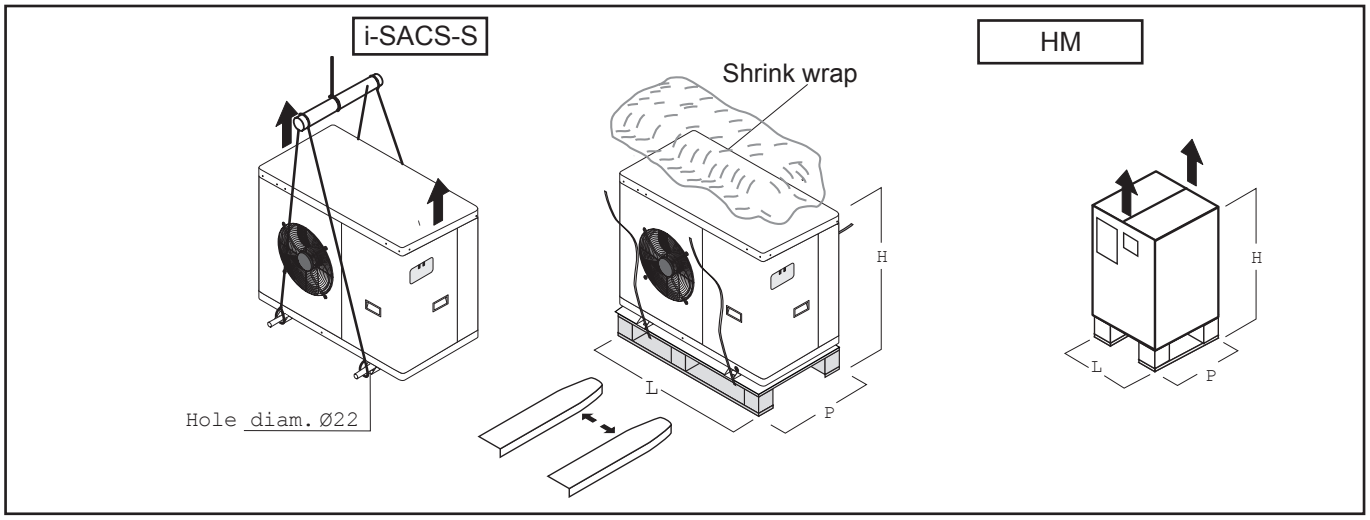
enclosed in a plastic envelope attached to the top of the hydronic module.
The unit should always be handled by qualified personnel using equipment adequate for the weight of the chiller.
If a forklift truck is used, insert the forks under the bed plate, spacing the forks as wide apart as possible.
If a crane is used, pass the cables through the bottom of the bed plate, making sure they do not exert pressure on the unit.

The installation, user and maintenance manual is an integral part of the unit and should therefore be read and kept carefully.

It is recommended that the packaging should not be removed until the unit is located in the installation site.

Do not dispose of packaging materials in the environment or leave them within reach of children as they may represent a hazard.

During transport, the unit should be kept in a vertical position.



Dimensions with packaging

i-SACS-S		0011	0021	0031	0041	0051	0061
Dimension L	[mm]	845	895	990	990	940	940
Dimension P	[mm]	335	302	340	340	340	340
Dimension H	[mm]	715	880	980	980	1265	1265
Gross weight for transport	[kg]	65	68	82	98	100	106
Operating weight	[kg]	64	67	81	97	99	105

HM		0011	0021	0031	0041	0051	0061
Dimension L	[mm]	425	425	425	425	425	425
Dimension P	[mm]	295	295	295	295	295	295
Dimension H	[mm]	950	950	950	950	950	950
Gross weight for transport	[kg]	49	49	50	52	53	55
Operating weight	[kg]	34	34	35	37	38	40

DESCRIPTION OF STANDARD UNIT

I A

The i-SACS-S and HM units operate with refrigerant fluid and are suitable for indoor installation.
The units conform to the essential requisites of EEC directive 98/37.
They are factory tested and on site installation is limited to electrical and refrigerant connections.

POWER AND CONTROL ELECTRICAL PANEL
Power and control electrical panel, built in compliance with the following directives:
2006/95/EC
2004/108/CE
98/37/CE

ACCESSORIES AVAILABLE
- Removable metal mesh filter.
- Rubber vibration dampers.

The above accessories are optional. Consult the relative documentation for assembly instructions and technical data.

i-SACS-S

COMPRESSORS
One hermetic **scroll** compressor complete with sump heater and thermal cut-out with speed control (inverter).

STRUCTURE
Panels and base are made from galvanised steel plate painted with epoxy powder to ensure total resistance to atmospheric agents.
Condensate collection pan as standard.

CONDENSING COILS
Made using copper tubes and aluminium fins with a high exchange surface area.
Condensing coil protection grills as standard.

FANS
External impeller axial-flow fans.
Six-pole electric motor with built-in thermal cut-out.
Housed in aerodynamic tubes with accident prevention grill.
Device for operation at low outside air temperatures: stepped fan rotation speed control according to the outside air temperature.

REFRIGERANT CIRCUIT
Unit fitted with one refrigerant circuit, complete with the following components: filter, electronic thermostatic expansion valve.
Pressure switches to control delivery and suction pressure.
Unit supplied complete with non-freezing oil and R410a refrigerant charge, **factory tested.**

HM

PUMPS
The units feature a pump with the moving parts in contact with the water made from corrosion resistant materials, extra wear ring on the impeller, built-in capacitor for high starting torque and automatic venting of impeller chamber.

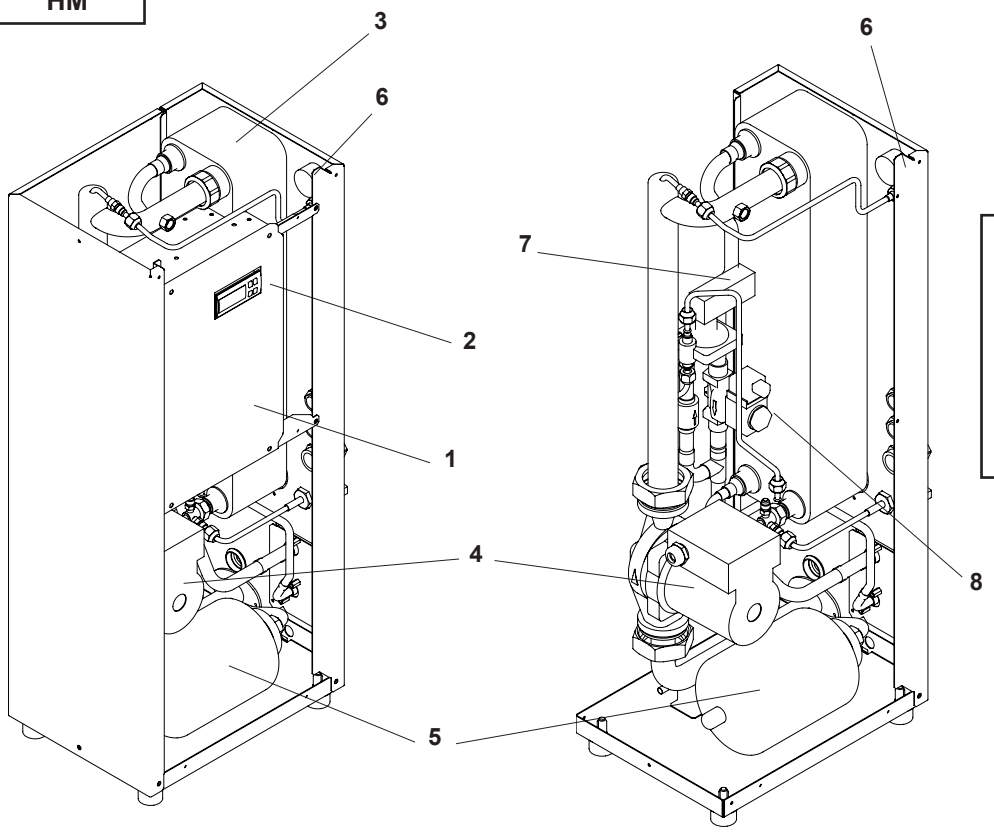
PUMP ASSEMBLY
Pump assembly with expansion tank, safety valve, manual filling assembly, pressure gauge and pump.

PLATE HEAT EXCHANGER
AISI 316 stainless steel plate type evaporator complete with **frost protection heater and differential pressure switch.**

STRUCTURE
Panels and base are made from galvanised steel plate painted with epoxy powder to ensure total resistance to atmospheric agents.

1 Electrical panel
2 Control panel
3 Heat exchanger installation side
4 Pump
5 Expansion tank
6 Pressure gauge
7 Differential pressure switch
8 Valve

HM



1 Electrical panel
2 Control panel
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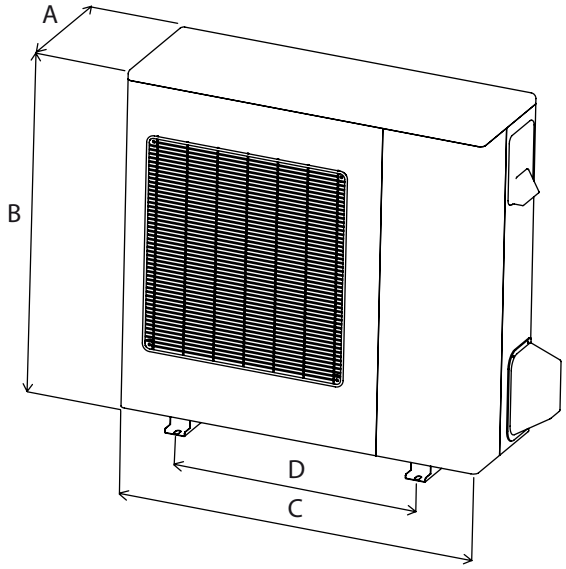
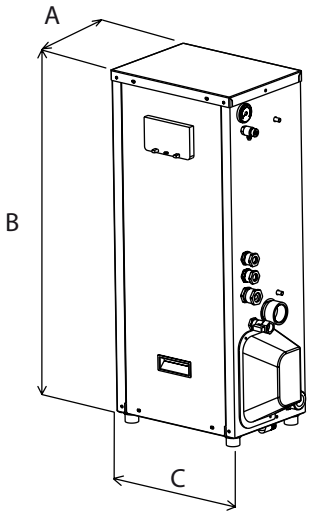
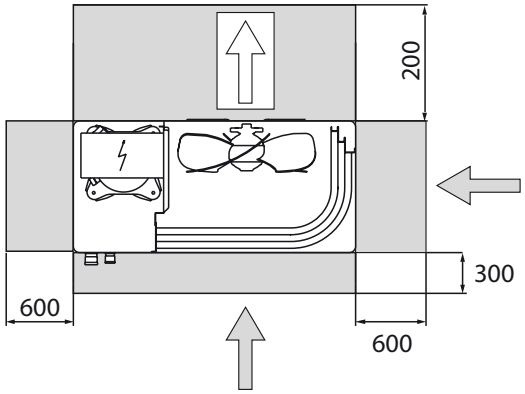
i-SACS-S

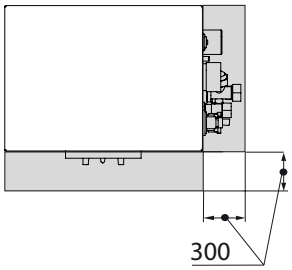


HM





CLEARANCE



i-SACS-S

Dimension [mm]	0011	0021	0031	0041	0051	0061
A	335	302	340	340	340	340
B	695	860	860	860	1245	1245
C	845	895	990	990	940	940
D	560	590		625	600	600

HM

Dimension [mm]	0011	0021	0031	0041	0051	0061
A	250	250	250	250	250	250
B	815	815	815	815	815	815
C	340	340	340	340	340	340

INSTALLATION

I

CHOICE OF INSTALLATION SITE

Before installing the unit, agree with the customer the site where it will be installed, taking the following points into consideration:

-check that the fixing points are adequate to support the weight of the unit;

-pay scrupulous respect to safety distances between the unit and other equipment or structures to ensure that air entering the unit and discharged by the fans is free to circulate.

POSITIONING

Before handling the unit, check the capacity of the lift equipment used, respecting the instructions on the packaging.

To move the unit horizontally, make appropriate use of a lift truck or similar, bearing in mind the weight distribution of the unit.

To avoid the slings damaging the unit, place protection between the slings and the unit.

Position the unit in the site indicated by the customer.

Place either a layer of rubber (min. thickness 10 mm) or vibration damper feet (optional) between the base and support surface.

Fix the unit, making sure it is level and that there is easy access to water and electrical components.

If the site is exposed to strong winds, fix the unit adequately using tie rods if necessary.

Make sure the condensate is drained using the drain hose supplied as standard.

Prevent leaves, branches or snow from accumulating around the unit and affecting correct operation.

WATER CONNECTIONS

I A

The choice and installation of components is the responsibility of the installer who should follow good working practice and current legislation.

Before connecting the pipes, make sure they do not contain stones, sand, rust, dross or other foreign bodies which might damage the system.

Construction of a bypass is recommended to enable the pipes to be washed through without having to disconnect the unit (see drain valves).

The connection piping should be supported in such a way as to avoid it weighing on the unit.

It is recommended that the following devices are installed in the evaporator water circuit:

1. Two pressure gauges with a suitable scale (intake and outlet);
2. Two vibration damper joints (intake and outlet);
3. Two gate valves (normal in intake and calibrating in outlet);
4. Two thermometers (inlet and outlet).

The flow of water to the chiller assembly must conform to the values indicated.

The flow of water must be maintained constant during operation.

The water content of the unit must be such as to avoid disturbing operation of the refrigerant circuits.

Refer to the values indicated.

The following components are required.

Failure to install these may void the warranty.

1. One intake flow switch as close as possible to the evaporator and positioned to allow easy access for routine maintenance.
2. An intake filter as close as possible to the evaporator and positioned to allow easy access for routine maintenance.

Before connecting the pipes, make sure they do not contain stones, sand, rust, dross or other foreign bodies which might damage the system.

Construction of a bypass is recommended to enable the pipes to be washed through without having to disconnect the unit (see drain valves).

Refer to the values indicated.

The following components are required.

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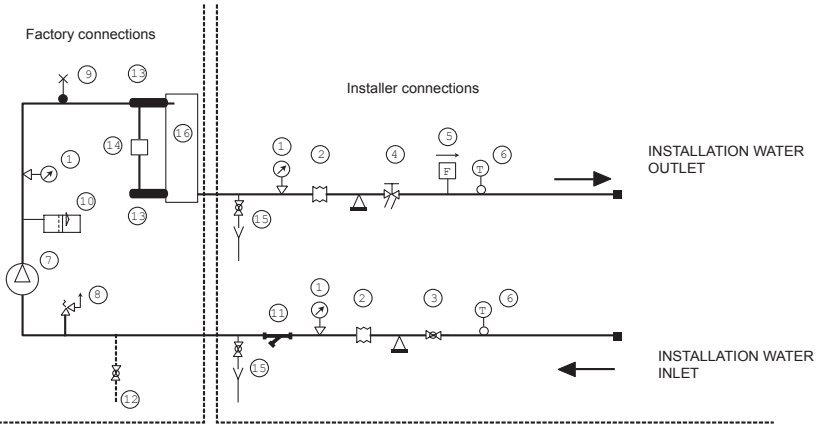
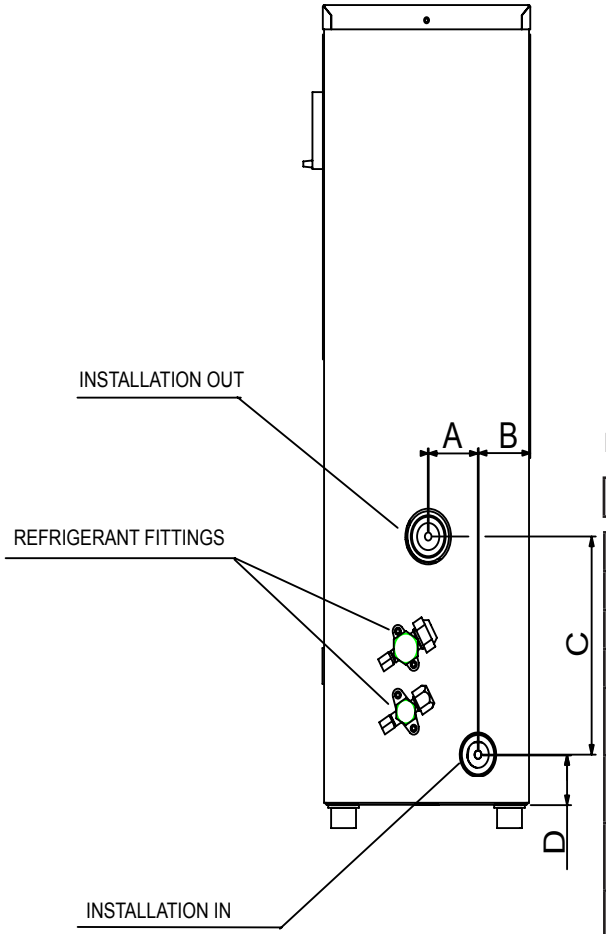


1 Pressure gauge
2 Vibration damper joint
3 Gate valve
4 Calibrating valve
5 Flow switch
6 Thermometer
7 Pump
8 Safety valve
9 Air vent
10 Expansion tank
11 Mesh filter
12 Fill/top-up
13 Temperature probe
14 Differential pressure switch
15 Drain / chemical washing valve
16 Plate heat exchanger

The chillers must be provided with a filling/top-up system connected to the return line and a drain cock in the lowest part of the installation.
Installations containing antifreeze or covered by specific legislation must be fitted with water circuit disconnectors.

The manufacturer is not liable for obstruction, breakage or noise resulting from the failure to install filters or vibration dampers.
Particular types of water used for filling or topping up must be treated with appropriate treatment systems.
For reference values, see the table.

PH	6-8
Electrical conductivity (25°C)	less than 200 mV/cm
Chlorine ions	less than 50 ppm
Sulphuric acid ions	less than 50 ppm
Total iron	less than 0.3 ppm
Alkalinity M	less than 50 ppm
Total hardness	less than 50 ppm
Sulphur ions	none
Ammonia ions	none
Silicon ions	less than 30 ppm



HM

Grandezza	0011	0021	0031	0041	0051	0061
A	60	60	60	60	60	60
B	63	63	63	63	63	63
C	215,5	215,5	215,5	215,5	215,5	215,5
D	49,5	49,5	49,5	49,5	49,5	49,5
Water connections Male inlet (dia.)	3/4”	3/4”	3/4”	1”1/4	1”1/4	1”1/4
Water connections Female outlet (dia.)	1”	1”	1”	1”1/4	1”1/4	1”1/4
Gas fittings suction [mm]	12,7	15,9	15,9	15,9	15,9	15,9
Two-phase gas fittings outlet [mm]	6,35	9,53	9,53	9,53	9,53	9,53

FILLING THE INSTALLATION

-Before filling, check that the installation drain valve is closed.
-Open all installation and terminal air vents.
-Open installation gate valves.
-Start filling by slowly opening the installation water fill cock outside the unit.
-When water begins to leak out of the terminal air vent valves, close them and continue filling until the pre sure gauge indicates a pressure of 1.5 bar.

The installation must be filled to a pressure of between 1 and 2 bars.

It is recommended that this operation be repeated after the unit has been operating for a number of hours.
The pressure of the installation should be checked regularly and if it drops below 1 bar, the water content should be topped-up.

Check the tightness of the joints.

EMPTYING THE INSTALLATION

-Before emptying, place the mains switch in the “off” position.
-Make sure the installation fill/top-up water cock is clo sed. -Open the drain cock outside the unit and all the installation and terminal air vent valves.

If the fluid in the circuit contains antifreeze, it should not be allowed to drain freely, as it is pollutant.
It should be collected for possible reuse.
When draining after heat pump operation, take care as the water may be hot (up to 50°).

The **i-SACS-S units and corresponding HM hydronic modules** leave the factory already wired, and require the installation of an thermal overload switch, a lockable mains disconnect switch for the connection to the mains power supply, and the connection of the flow switch to the corresponding terminals. All the above operations must be carried out by qualified personnel in compliance with the legislation in force.

For all electrical work, refer to the electrical wiring diagrams in this manual.
It is also recommended to check that:
-The characteristics of the mains electricity supply are adequate for the power ratings indicated in the electrical specifications below, also bearing in mind the possible use of other equipment at the same time.

Power to the unit must be turned on only after installation work (water and electrical) has been completed.
All electrical connections must be carried out by qualified personnel in accordance with legislation in force in the country concerned.
Respect instructions for connecting phase, neutral and earth conductors..
The power line should be fitted upstream with a suitable device to protect against short-circuits and leakage to earth, isolating the installation from other equipment.

Voltage must be within a tolerance of ±10% of the rated power supply voltage for the unit (for three phase units, the unbalance between the phases must not exceed 3%).
If these parameters are not respected, contact the electricity supply company.
For electrical connections, use double insulationcable in conformity with legislation in force in the country concerned.
A thermal overload switch and a lockable mains disconnect switch, in compliance with the CEI-EN standards (contact opening of at least 3mm), with adequate switching and residual current protection capacity based on the electrical data table shown below, must be installed as near as possible to the appliance.

An efficient earth connection is obligatory.
The manufacturer cannot be held liable for any damage caused by the failure to correctly earth the unit.
In the case of three phase units, ensure the phases are connected correctly.

Do not use water pipes to earth the unit.

POWER CONNECTIONS
For the functional connection of the unit, bring the power supply cable to the electrical panel inside the unit and connect it to terminals U-N and ***, respecting the (U) phase, (N) neutral and earth in the case of single phase units (230V~50Hz), or U-V-W phases, N neutral and PE earth in three phase units (400V-3N~ 50Hz).

CONNECTION BETWEEN OUTDOOR UNIT AND INDOOR UNIT

The i-SACS-S outdoor unit and the HM hydronic module must be connected via a serial bus.
The connection is made by connecting terminals 15, 16 and 17 on the hydronic module and the terminal block on the outdoor unit (i-SACS-S).
For further information, see the wiring diagrams shown on the following pages.
For connection use shielded cables.

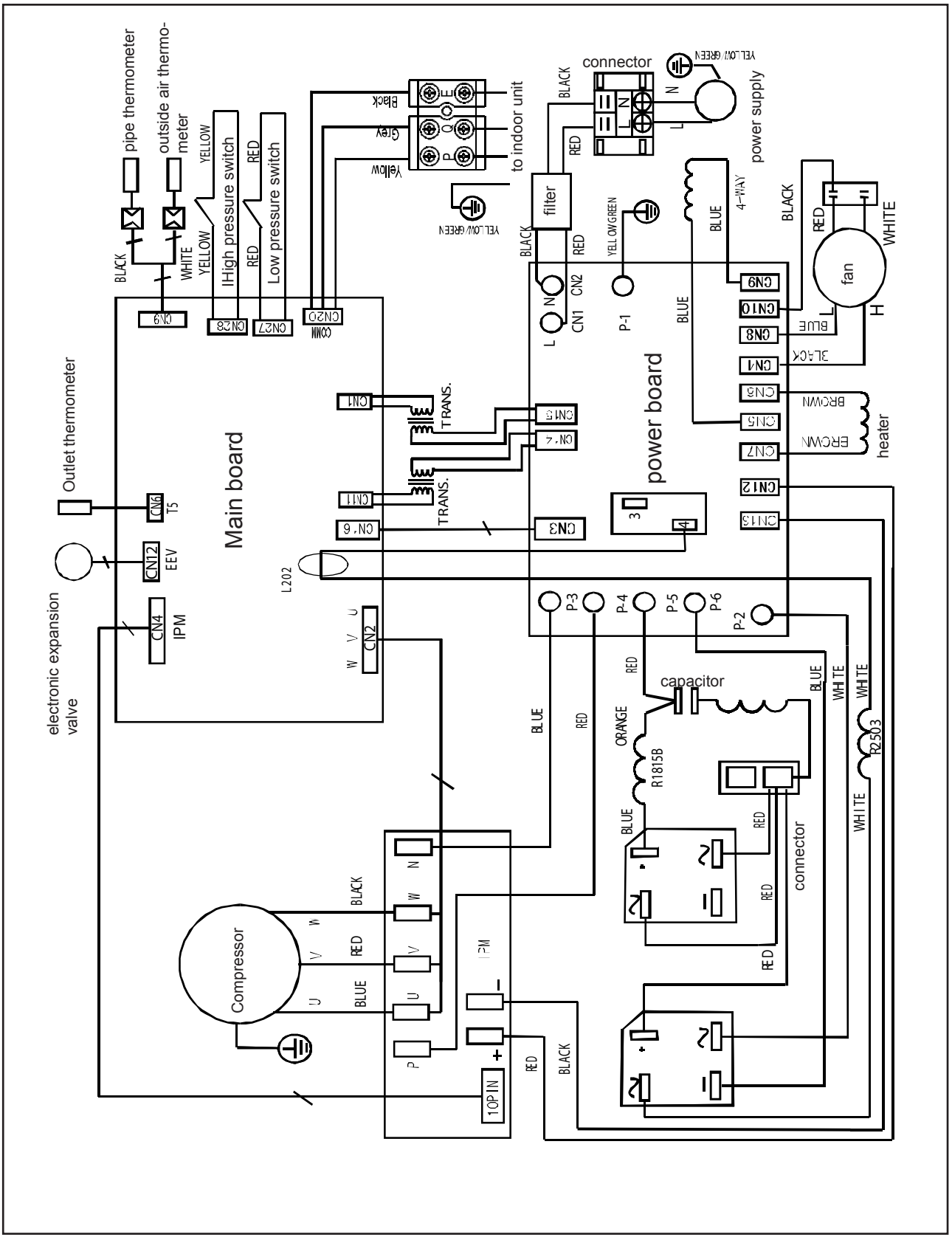
For the power supply to the unit, there must be no bridges between the terminal block on the hydronic module (HM) and terminals P-Q-E on the outdoor unit.

ELECTRICAL DATA

i-SACS-S								
Size	Power supply (V-Ph-Hz)	Maximum values						FUSES [A] (2)
		Compressori		Fan/fans		Total		
		F.L.I.	L.R.A.	F.L.I.	F.L.A.	F.L.I.	F.L.A. (1)	
		[kW]	[A]	[kW]	[A]	[kW]	[A]	
0011	230 ~1~50	2,47	28	0,13	0,6	2,6	13,0	20
0021	230 ~1~50	2,65	28	0,15	0,7	2,8	14,0	20
0031	230 ~1~50	4,29	28	0,31	1,4	4,6	23,0	25
0041	400 ~3~50	4,29	28	0,31	1,4	4,6	7,7	15
0051	400 ~3~50	5,7	28	0,30	1,6	6,0	10,0	15
0061	400 ~3~50	6,7	28	0,30	1,6	7,0	11,7	15

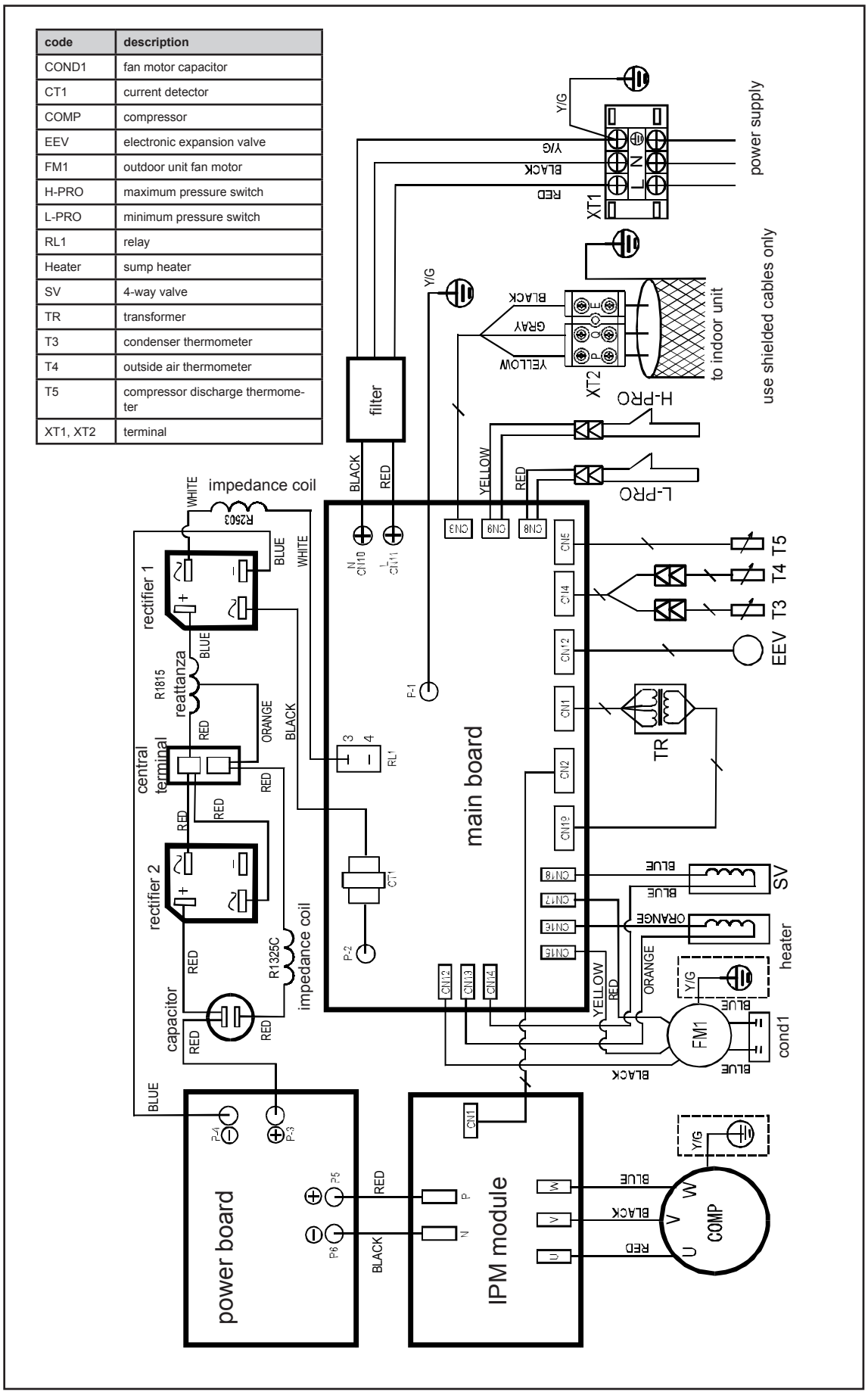
HM						
Size	Power supply (V-Ph-Hz)	Maximum values		Total (1)		FUSES [A] (2)
		Pump				
		F.L.I.	F.L.A.	F.L.I.	F.L.A.	
		[kW]	[A]	[kW]	[A]	
0011	230 ~1~50	0,2	1,0	0,2	1,0	1,25
0021	230 ~1~50	0,2	1,0	0,2	1,0	1,25
0031	230 ~1~50	0,2	1,0	0,2	1,0	1,25
0041	230 ~1~50	0,2	1,0	0,2	1,0	1,25
0051	230 ~1~50	0,2	1,0	0,2	1,0	1,25
0061	230 ~1~50	0,2	1,0	0,2	1,0	1,25

F.L.I. Maximum power input
F.L.A. Maximum current input
(1) Use these values when sizing protection switches and power cables.
(2) Glass fuses, 5x20mm 250V, slow-blow type “T”

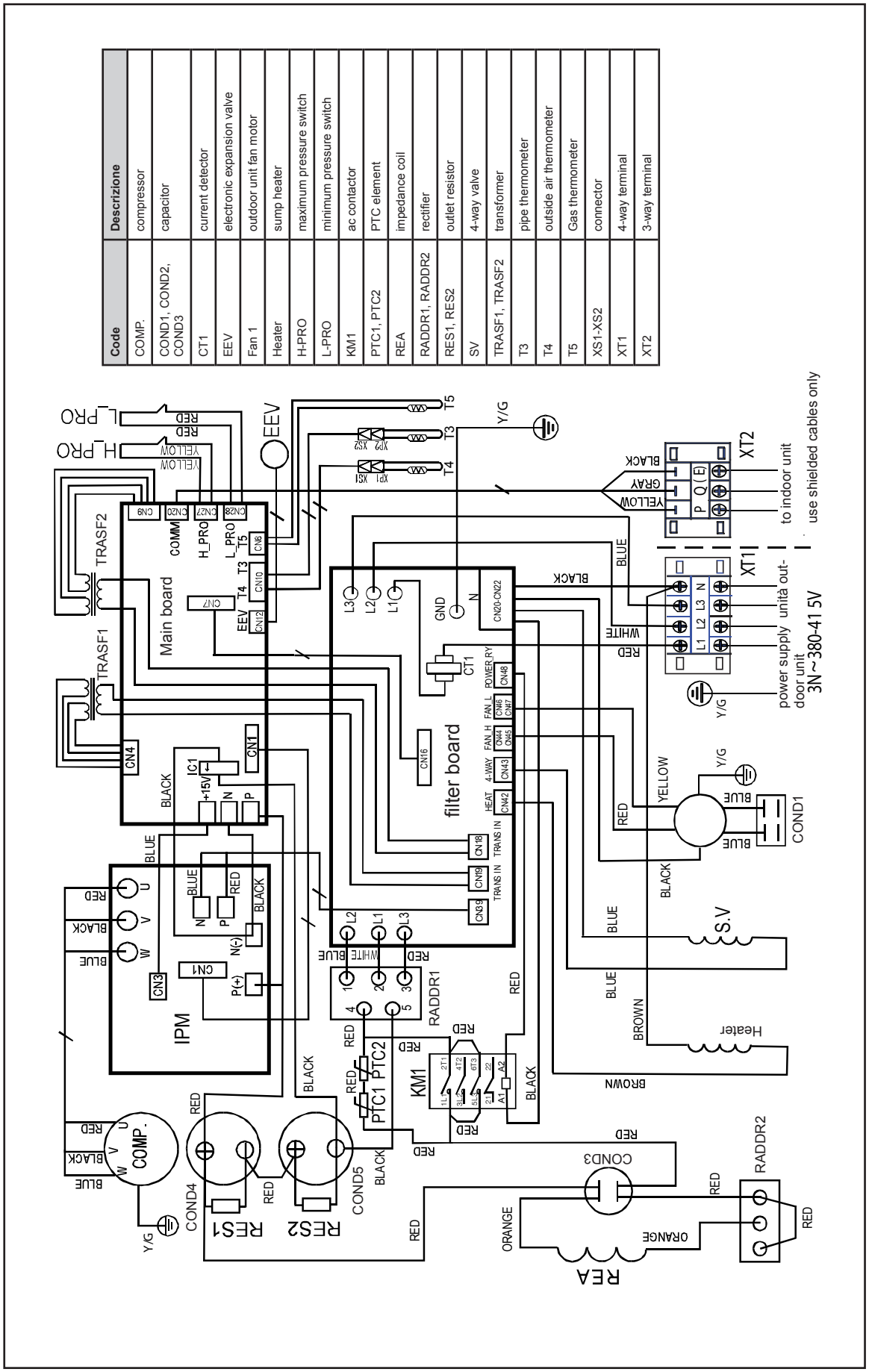

pipe thermometer
outside air thermo-meter
High pressure switch
Low pressure switch
to indoor unit
connector
power supply
filter
4-WAY
fan
heater
Outlet thermometer
electronic expansion valve
Main board
power board
TRANS.
TRANS.
capacitor
Compressor
connector
BLACK
RED
BLUE
WHITE
YELLOW
ORANGE
YELLOW/GREEN
Grey
Yellow
R1815B
R2503
IPM
EEV
T5
CN1
CN2
CN3
CN4
CN5
CN6
CN7
CN8
CN9
CN10
CN11
CN12
CN15
CN20
CN26
CN27
P-1
P-2
P-3
P-4
P-5
P-6
L202
TOPIN

i-SACS-S 0031 SINGLE-PHASE WIRING DIAGRAM

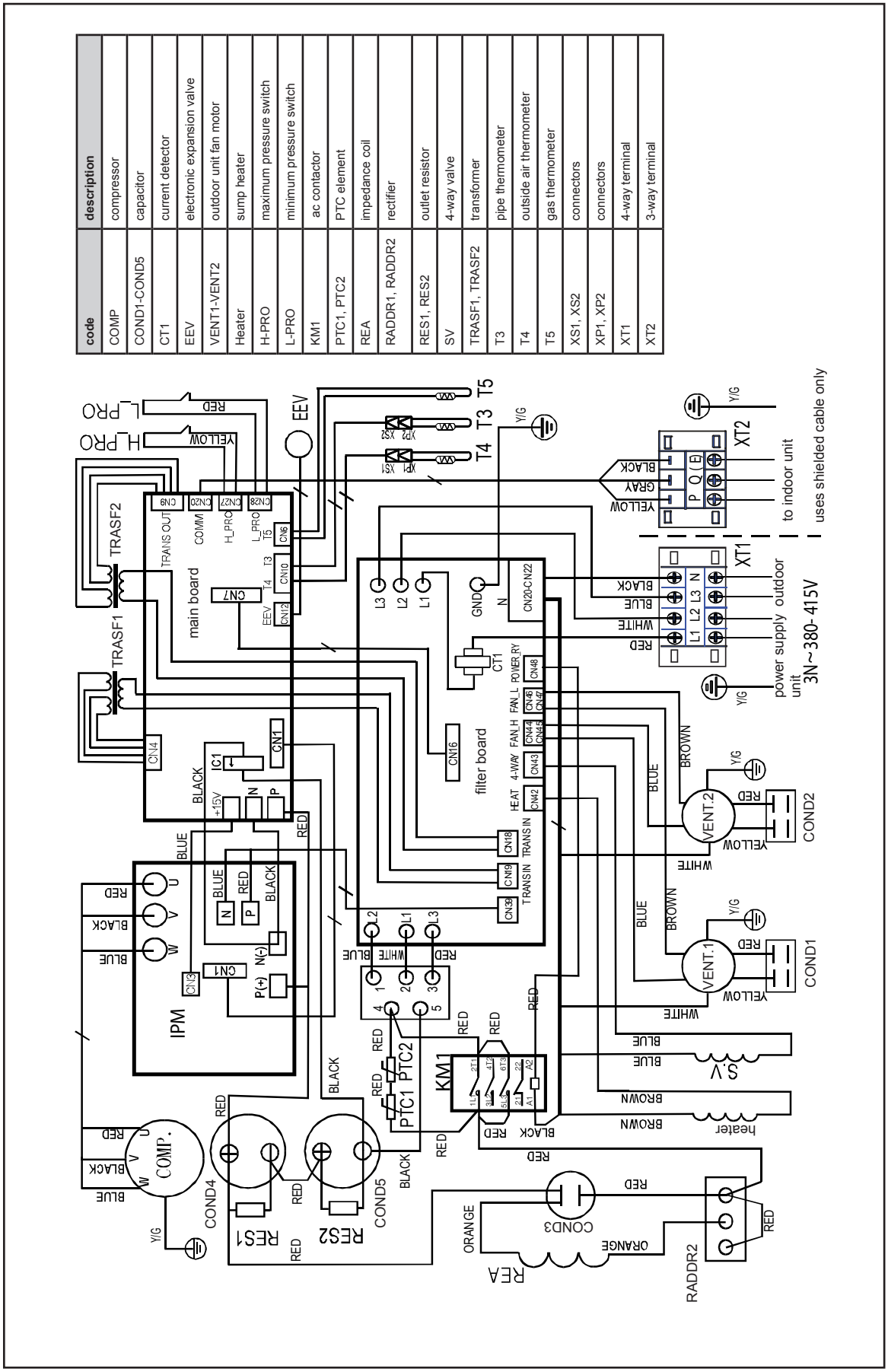
code	description
COND1	fan motor capacitor
CT1	current detector
COMP	compressor
EEV	electronic expansion valve
FM1	outdoor unit fan motor
H-PRO	maximum pressure switch
L-PRO	minimum pressure switch
RL1	relay
Heater	sump heater
SV	4-way valve
TR	transformer
T3	condenser thermometer
T4	outside air thermometer
T5	compressor discharge thermometer
XT1, XT2	terminal

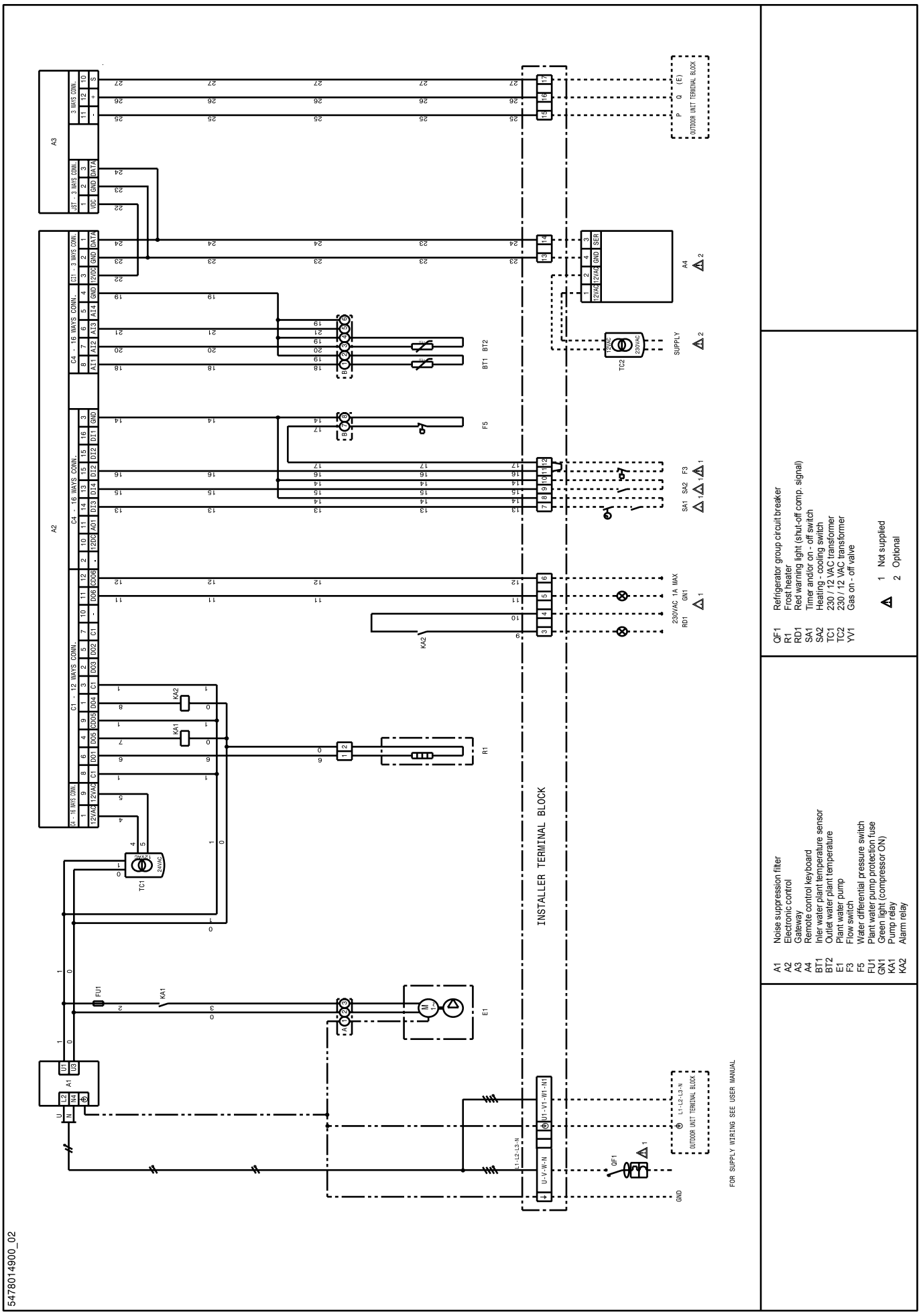


Code	Descrizione
COMP.	compressor
COND1, COND2, COND3	capacitor
CT1	current detector
EEV	electronic expansion valve
Fan 1	outdoor unit fan motor
Heater	sump heater
H-PRO	maximum pressure switch
L-PRO	minimum pressure switch
KM1	ac contactor
PTC1, PTC2	PTC element
REA	impedance coil
RADDR1, RADDR2	rectifier
RES1, RES2	outlet resistor
SV	4-way valve
TRASF1, TRASF2	transformer
T3	pipe thermometer
T4	outside air thermometer
T5	Gas thermometer
XS1-XS2	connector
XT1	4-way terminal
XT2	3-way terminal



code	description
COMP	compressor
COND1-COND5	capacitor
CT1	current detector
EEV	electronic expansion valve
VENT1-VENT2	outdoor unit fan motor
Heater	sump heater
H-PRO	maximum pressure switch
L-PRO	minimum pressure switch
KM1	ac contactor
PTC1, PTC2	PTC element
REA	impedance coil
RADDR1, RADDR2	rectifier
RES1, RES2	outlet resistor
SV	4-way valve
TRASF1, TRASF2	transformer
T3	pipe thermometer
T4	outside air thermometer
T5	gas thermometer
XS1, XS2	connectors
XP1, XP2	connectors
XT1	4-way terminal
XT2	3-way terminal

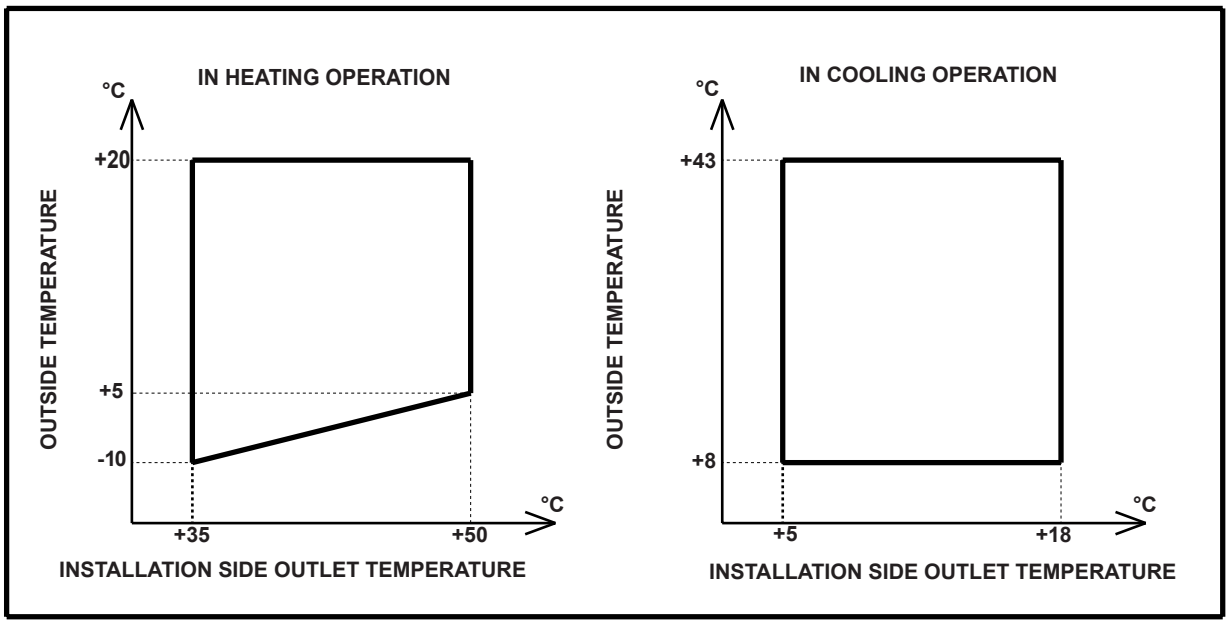



A1 Noise suppression filter
A2 Electronic control
A3 Gateway
A4 Remote control keyboard
BT1 Inler water plant temperature sensor
BT2 Outlet water plant temperature
E1 Plant water pump
F3 Flow switch
F5 Water differential pressure switch
FU1 Plant water pump protection fuse
GN1 Green light (compressor ON)
KA1 Pump relay
KA2 Alarm relay
QF1 Refrigerator group circuit breaker
R1 Frost heater
RD1 Red warning light (shut-off comp. signal)
SA1 Timer and/or on - off switch
SA2 Heating - cooling switch
TC1 230 / 12 VAC transformer
TC2 230 / 12 VAC transformer
YV1 Gas on - off valve
1 Not supplied
2 Optional
INSTALLER TERMINAL BLOCK
OUTDOOR UNIT TERMINAL BLOCK
FOR SUPPLY WIRING SEE USER MANUAL
5478014900_02

i-SACS-S		0011	0021	0031	0041	0051	0061
Cooling capacity	[kW]	4,4	5,6	7,2	8,5	11,2	12,8
Compressor power input	[kW]	1,68	2,13	2,72	3,2	4,22	4,87
Heating capacity	[kW]	5,6	7,2	9,0	10,6	13,9	15,9
Compressor power input	[kW]	2,01	2,58	3,21	3,81	4,93	5,71
Compressors	no.	1	1	1	1	1	1
Maximum allowable pressure PS L (4)	MPa	2,0	2,0	2,0	2,0	2,0	2,0
H		4,2	4,2	4,2	4,2	4,2	4,2
Power supply	V/ph/Hz	230/1/50			400/3/50		
Total power input (unit)	kW	2,01	2,58	3,21	3,81	4,93	5,71
Electrical panel index of protection	IP	X4	X4	X4	X4	X4	X4
Fans	nr	1	1	1	2	2	2
Max. air flow	m3/h	2400	3000	5000	5000	6000	6000
Noise level	dB(A)	48	52		54	58	60
R410A refrigerant charge	kg	1,65	2,20	3,35	2,90	3,85	3,85
KAF68D1 oil	kg	0,80	0,80	-	-	-	-
MEL36 oil	kg	-	-	0,67	1,70	1,70	1,70
Operating weight	kg	64	67	81	97	99	105

HM		0011	0021	0031	0041	0051	0061
Utility evaporator water flow-rate	m3/h	0,75	0,97	1,24	1,46	1,97	2,2
Residual head	kPa	63	63	62	62	93	94
Power supply	V/ph/Hz	230/1/50					
Minimum installation water content	l/kW	2,0	2,0	2,5	2,5	3,0	3,0
Noise level	dB(A)	-	-	-	-	-	-
Operating weight	kg	34	34	35	37	38	40
Index of protection	IP	X4	X4	X4	X4	X4	X4

(1) outside air 35°C; evaporator water IN/OUT 12/7°C
(2) outside air 7°C; condenser water in/out 40/45°C
(3) at 1m in open field fan side
(4) the maximum and minimum operating pressure values refer to the activation of the pressure switches
(5) the total power input does not include the water pump.



Thermal head min. max	3 ÷ 8
Water circuit pressure (bars)	1 ÷ 6
Max. storage temperature (°C)	63

ETHYLENE GLYCOL SOLUTIONS

Water and ethylene glycol solutions used as a heat carrier in the place of water reduce the performance of the unit.
Multiply the performance figures by the values given in the following table.

Freezing point (°C)						
	0	-5	-10	-15	-20	-25
Percentage of ethylene glycol in weight						
	0	12%	20%	28%	35%	40%
cPf	1	0,985	0,98	0,974	0,97	0,965
cQ	1	1,02	1,04	1,075	1,11	1,14
cdp	1	1,07	1,11	1,18	1,22	1,24

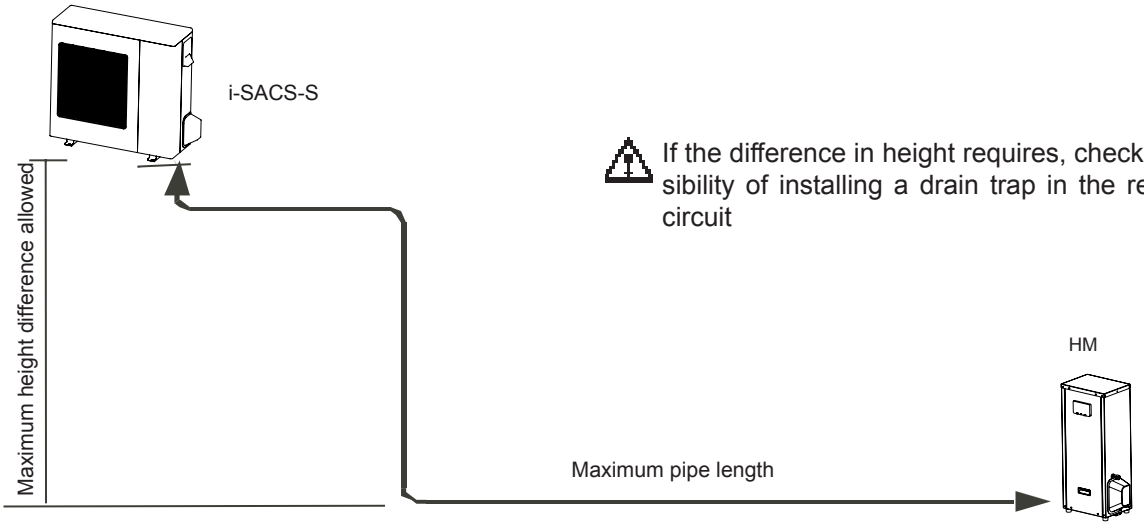
cPf: cooling capacity correction factor
cQ: flow rate correction factor
cdp: pressure drop correction factor

FOULING FACTORS

The performance data given refer to conditions with clean evaporator plates (fouling factor=1).
For different fouling factors, multiply the figures in the performance tables by the coefficient given in the following table.

Fouling factors	Evaporator		
(m² °C/W)	f1	fk1	fx1
$4,4 \times 10^{-5}$	-	-	-
$0,86 \times 10^{-4}$	0,96	0,99	0,99
$1,72 \times 10^{-4}$	0,93	0,98	0,98

f1 capacity correction factor
fk1 compressor power input correction factor
fx1 total power input correction factor



If the difference in height requires, check the possibility of installing a drain trap in the refrigerant circuit

REFRIGERANT QUANTITY

Calculate the quantity of refrigerant to be added according to the diameter and the length of the connection pipes between i-SACS-S and HM

Pipe diameter	Quantity of refrigerant to add per metre of pipe
Ø 6.35	0.022kg
Ø 9.53	0.060kg
Ø 12.7	0.110kg
Ø 15.9	0.190kg
Ø 19.0	0.290kg
Ø 22.0	0.380kg

	Allowed value
Maximum pipe length	15 m
Maximum height difference allowed	8 m

CHECKING AND STARTING UP THE UNIT

A

PREPARING FOR FIRST START UP

Restarting after shutting down for long periods

The unit must be started up for the first time by the **Technical Service** (where envisaged in the supply contract).

Before starting up the chillers, make sure that:

-All safety conditions have been respected;
-The chiller is adequately fixed to the surface it rests on;
-Clearances have been respected
-Water connections have been carried out as indicate in the instruction manual;
-The water circuit is filled and vented. If emptying after heating operation beware of the water temperature;
;
-The water valves are open;
-Electrical connections have been carried out correctly
-Voltage is within a tolerance of 10% of the rated vo tage for the unit;
-The unit is correctly earthed;
-All electrical connections are tight and all water co nections have been carried out correctly.

The unit must be started up for the first time with standard settings. Set Point values may be modified only after testing has been completed. Before starting up, power up the unit for at least two hours to the end to allow the oil in the compressor sump to heat up.

SHUTTING DOWN FOR LONG PERIODS

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If there is a possibility that the **outside temperature** may drop below zero, there is a risk of freezing.
The water circuit MUST BE EMPTIED AND CLOSED (if emptying after heating operation beware of the water temperature) or antifreeze must be added in the proportion recommended by the manufacturer.

ROUTINE MAINTENANCE

A

Never perform any cleaning operations before having disconnected the unit from the mains power supply.
Check for voltage before proceeding.
Regular maintenance is fundamental to maintain the efficiency of the unit both in terms of operation and energy consumption.
The Technical Service maintenance plan must be observed, with an annual service which includes the following operations and checks:
-Filling of the water circuit;
-Presence of air bubbles in the water circuit;
- Efficiency of safety devices;
-Power supply voltage;
- Electrical power input;
-Tightness of electrical and water connections;
-Refrigerant charge
-Cleaning of the water filter
-Operation and cleaning of the flow switch
-Condition of the compressor contactor;
-Efficiency of the plate heat exchanger resistor;
-Verification of operating pressure, superheating and subcooling
-Efficiency of the compressor heater
-Cleaning of the finned coil
-Cleaning of the fan grills

For units installed near the sea, the intervals between maintenance should be halved**.**

SPECIAL MAINTENANCE

A

Never perform any cleaning operations before having disconnected the unit from the mains power supply.
Check for voltage before proceeding.

CHEMICAL WASHING
It is recommended to chemically flush the plate heat exchanger after every 3 years of operation.
For instructions on how to carry out this operation, call the toll free number.

REFRIGERANT GAS CONTENT
The chillers are filled with R410A refrigerant gas and tested in the factory.
In normal conditions, there should be no need for the Technical Service to intervene to check the refrigerant gas.
However, over time, small leaks may develop at the joints leading to loss of refrigerant and draining of the circuit, causing the unit to function poorly.
In this case, the leaks of refrigerant must be identified and repaired and the refrigerant circuit recharged.
Proceed as follows:
-Empty and dry the entire refrigerant circuit using a vacuum pump connected to the low and high pressure tap until the vacuometer reads about 10 Pa.
Wait a couple of minutes and check that this value does not rise to more than 50 Pa.
-Connect the refrigerant gas cylinder or a filling cylinder to the low pressure line pressure gauge connection
- Fill with the quantity of refrigerant gas indicated on the rating plate of the unit;
- Always check the superheating and subcooling values, which, in normal appliance operating conditions, should be between 4 and 8 °C.

In the event of partial leaks, the circuit must be completely emptied before being recharged.

The R410A refrigerant must only be charged in the liquid state.

Operating conditions other than rated conditions may produce considerably different values.

Seal testing or identification of leaks must only be carried out using R410A refrigerant gas, checking with a suitable leak detector.

The refrigerant circuit **must not be charged** with a refrigerant other than that indicated.

Oxygen, acetylene or other inflammable or poisonous gases **must never be used** in the refrigerant circuit as they may cause explosion or poisoning.

Oils other than those indicated **must not be used.**
The use of a different oil may cause serious damage to the compressor.

LIST OF ALARMS ON i-SACS-S CONTROLLER

Display	Alarm description
E0	EEPROM error
E2	Communication error between outdoor unit and indoor unit
E3	Communication error on the outdoor unit
E4	Outside air temperature sensor error
E5	Compressor voltage protection
P1	High pressure protection
P2	Low pressure protection
P3	Compressor current protection
P4	Compressor discharge temperature protection
P5	Outdoor condenser high temperature protection
P6	Maximum temperature protection

To see the display indicating the error codes, remove the top cover on the i-SACS-S unit.
The error code is shown on the display on the electronic board.

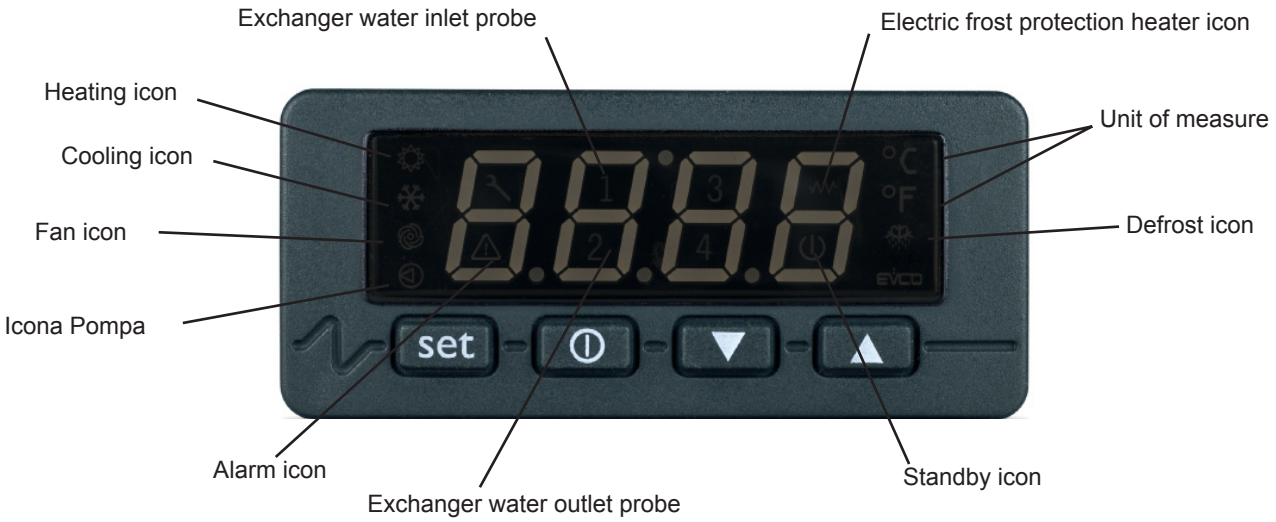
LIST OF ALARMS ON HM CONTROLLER

Codice	Descrizione allarme	Tipo	Azione
AI01	Compressor inverter current protection	Auto	Compressor off
AI02	Compressor inverter voltage protection	Auto	Compressor off
AI03	Inverter phase sequence	Auto	Compressor off
AI04	Outside probe fault error	Auto	Compressor off
AL01	Low intake temperature	Segnalaz.	Alarm icon on display on
AL02	High intake temperature	Segnalaz.	Alarm icon on display on
AL05	Evaporator flow switch	A/M*	Compressor off. The pump continues operating.
AL81	Evaporator frost protection	Man.	Compressor off
AC01	Compressor operating hours	Auto	Alarm icon on display on
AP01	Pump operating hours	Auto	Alarm icon on display on
ES01	Installation inlet temp. probe malfunction or disconnected	Auto	Compressor off
ES02	Installation outlet temp. probe malfunction or disconnected	Auto	Compressor off
EN01	Communication alarm inside the hydronic module	A/M**	Alarm icon on display on
EN02	Communication alarm between hydronic module and consensing unit.	A/M**	Alarm icon on display on

* The flow switch alarm is reset automatically if it remains active for less than 20 sec, or manually for more 20 sec and in any case when activated twice in 1 hour
** Automatic for 3 activations, manual when activated four times in 1 hour

FAULT	CAUSE	SOLUTION
The unit doesn't start	Power failure (condensing unit and hydronic module)	-Check presence of voltage -Check safety systems upstream of the appliance
	Mains switch in OFF position Remote switch (if featured) in OFF position Control panel set to OFF	Switch ON
	Supply voltage too low	Check power line
	Contactor coil faulty Electronic boards faulty Start-up capacitor faulty (if featured) Compressor faulty	Replace the component
Insufficient capacity	Insufficient refrigerant Appliance undersized Operation outside recommended limits	Check
Compressor noisy	Liquid returning to compressor Inadequate fastening	Check
Noise and vibrations	Contact between metal bodies	Check
	Weak foundations	Repair
	Loose screws	Tighten screws
Il compressore si ferma per intervento delle protezioni	Pressione mandata eccessiva Pressione aspirazione bassa Tensione alimentazione bassa Collegamenti elettrici mal serrati Funzionamento fuori dei limiti ammessi	Check
	Faulty operation of pressure switches	Replace the component
	Thermal protector tripped	Check supply voltage Check electrical insulation of windings

FAULT	CAUSE	SOLUTION
High discharge pressure (greater than 3.5 MPa)	High outside air temperature High water inlet temperature	Check
	Insufficient air flow Insufficient water flow	Check fan operation Check pump operation
	Abnormal fan operation	Check
	Air in water circuit	Vent
	Excessive refrigerant content	Check
Low discharge pressure (less than 1.8 MPa)	Low outside air temperature Low water inlet temperature	Check
	Humidity in the refrigerant circuit (liquid sight glass)	Empty and refill
	Abnormal fan operation	Check
	Air in water circuit	Vent
	Insufficient refrigerant content	Check
High suction pressure (greater than 1.7 MPa)	High outside air temperature High water inlet temperature Thermostatic expansion valve malfunction	Check
Low suction pressure (less than 0.62 MPa)	Low water inlet temperature Low inflow air temperature Thermostatic expansion valve faulty or blocked Blocked water filter Blocked plate heat exchanger	Check

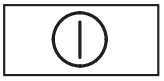


The controller features a user interface with display, made up of four 7-segment digits and 15 icons.
The keypad has 4 buttons for navigating inside the display and programming menus:

▲	UP: scroll the display and programming menu, scroll parameters, in parameter programming mode.
▼	DOWN: scroll the display and programming menu, scroll parameters, in parameter programming mode.
set	SET: in programming mode confirms of the value; otherwise activated the selected function. The SET button, if held for around 2 seconds, accessed the main menu. If displaying an alarm page, pressed for around 2 seconds resets the alarm. If displaying the alarm pages, when pressed scrolls the active alarms. The button also has the ENTER function for access to different levels of programming.
⏻	STANDBY: in programming mode exits the menu without saving the changes made. The STANDBY button, if held for around 2 seconds, switches the unit on/off. If pressed on the main page, accesses the list of all the active alarms.

The following icons are also used

☼	Heating icon: identifies heating operating mode (heat pump).
❄	Cooling icon: identifies cooling operating mode (chiller).
	Fan icon: identifies compressor + fan status. I f on steady the compressor is operating, if flashing an on/off timer is active.

	Pump icon: if on steady the pump is on, if flashing fast signals that an on timer is active. If flashing slow signals that the shutdown of the water pump is delayed during changeover or when shutting down the unit.
	Alarm icon: if on, alarms are active. Flashing signals a new alarm that has not yet been acknowledged. When the unit is off, if there are alarms the icon flashes.
	Maintenance icon: identifies a maintenance request. If on steady, the compressor has been started in manual mode, if flashing the compressor or pump has exceeded the set number of operating hours.
	Standby icon: associated with the STANDBY  button, identifies the status of the unit: • - Off: unit on • - On: unit off but powered (unit in standby with power on) • - Flashing slow: unit off from digital input • - Flashing fast: unit off from supervisor (if featured)
	Defrost icon: if on indicates that in the condensing unit is running a defrost.
	°C/°F icon: indicates the temperature unit of measure.
	Electric frost protection heater icon: identifies the status of the frost protection control and alarm. If on the heaters are active, if flashing the alarm is active.

DISPOSAL

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The unit must be disposed of according to the legislation in force in the country concerned.

USEFUL INFORMATION

U I A

For information on technical assistance and obtaining spare parts, contact:

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CLIMAVENETA HOME SYSTEM SRL ROOM AIR-CONDITIONING
via. L. Seitz, 47 - 31100 Treviso (ITALY)

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